

APPENDIX I

WESTERN
SOIL AND FOUNDATION ENGINEERING, INC.

SPECIFICATIONS FOR CONSTRUCTION OF CONTROLLED FILLS

General Description: The construction of controlled fills shall consist of adequate geotechnical investigations, and clearing, removal of existing structures and foundations, preparation of land to be filled, excavation of earth and rock from cut area, compaction and control of the fill, and all other work necessary to complete the grading of the filled area to conform with the lines, grades, and slopes as shown on the accepted plans.

Clearing And Preparation Of Areas To Be Filled:

- (1) All fill control projects shall have an investigation or a visual examination, depending upon the nature of the job, performed by a qualified soil engineer prior to grading.
- (2) All timber, trees, brush, vegetation, and other rubbish shall be removed, piled and burned, or otherwise disposed of to leave the prepared area with a finished appearance free from unsightly debris.
- (3) Any soft, swampy or otherwise unsuitable areas, shall be corrected by drainage or removal of compressible material, or both, to the depths indicated on the plans or as directed by the soil engineer.
- (4) The natural ground which is determined to be satisfactory for the support of the filled ground shall then be plowed or scarified to a depth of at least six inches (6") or deeper as specified by the soil engineer, and until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.
- (5) No fill shall be placed until the prepared native ground has been approved by the soil engineer.
- (6) Where fills are made on the hillsides with slopes greater than 5 (horizontal) to 1 (vertical), horizontal benches shall be cut into firm undisturbed natural ground to provide lateral and vertical stability. The initial bench at the toe of the fill shall be at least 10 feet in width on firm undisturbed natural ground at the elevation of the toe stake. The soil engineer shall determine the width and frequency of all succeeding benches which will vary with the soil conditions and the steepness of slope.
- (7) (After the natural ground has been prepared, it shall be brought to the proper moisture content and compacted to not less than 90% of maximum density, A.S.T.M. D1557-91.

- (8) Expansive soils may require special compaction specifications as directed in the report of geotechnical investigation by the soil engineer.
- (9) The cut portions of building pads may require excavation and recompaction for density compatibility with the fill as directed by the soil engineer.

Materials: The fill soils shall consist of select materials graded so that at least 40 percent of the material passes the No. 4 sieve. The material may be obtained from the excavation, a borrow pit, or by mixing soils from one or more sources. The material used shall be free from vegetable matter, and other deleterious substances, and shall not contain rocks or lumps greater than 6 inches in diameter. If excessive vegetation, rocks, or soils with unacceptable physical characteristics are encountered, these materials shall be disposed of in waste areas designated on the plans or as directed by the soil engineer. If soils are encountered during the grading operation which were not reported in the report of geotechnical investigation, further testing will be required to ascertain their engineering properties. Any special treatment recommended in the preliminary or subsequent soil reports not covered herein shall become an addendum to these specifications.

No material of perishable, spongy, or otherwise unstable nature shall be used in the fills.

Placing, Spreading And Compacting Fill Material:

- (1) The selected fill material shall be placed in layers which shall not exceed six inches (6") when compacted. Each layer shall be spread evenly and shall be thoroughly blade-mixed during the spreading to insure uniformity of material and moisture in each layer.
- (2) When the moisture content of the fill material is below that specified by the soil engineer, water shall be added until the moisture content is near optimum as determined by the soil engineer to assure thorough bonding during the compacting process.
- (3) When the moisture content of the fill material is above that specified by the soil engineer, the fill material shall be aerated by blading and scarifying, or other satisfactory methods until the moisture content is near optimum as determined by the soils engineer.
- (4) After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than the specified maximum density in accordance with A.S.T.M. D1557-91. Compaction shall be by means of tamping or sheepfoot rollers, multiple-wheel pneumatic-tired rollers, or other types of rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient passes to obtain the desired density. The entire area to be filled shall be compacted to the specified density.

- (5) Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting operations shall be continued until the slopes are stable and until there is no appreciable amount of loose soil on the slopes. Compacting of the slopes shall be accomplished by backrolling the slopes in increments of 3 to 5 feet in elevation gain or by other methods producing satisfactory results.
- (6) Field density tests shall be made by the soil engineer for approximately each foot in elevation gain after compaction, but not to exceed two feet in vertical height between tests. The location of the tests in plan shall be spaced to give the best possible coverage and shall be taken no farther than 100 feet apart. Tests shall be taken on corner and terrace lots for each two feet in elevation again. The soil engineer may take additional tests as considered necessary to check on the uniformity of compaction. Where sheepsfoot rollers are used, the tests shall be taken in the compacted material below the disturbed surface. No additional layers of fill shall be spread until the field density tests indicate that the specified density has been obtained.
- (7) The fill operation shall be continued in six inch (6") compacted layers, as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plans.

Supervision: Supervision by the soil engineer shall be made during the filling and compacting operations so that he/she can certify that the fill was made in accordance with accepted specifications.

The specifications and soil testing of subgrade, subbase, and base materials for roads, or other public property shall be done in accordance with specifications of the governing agency.

Seasonal Limits: No fill material shall be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, grading shall not be resumed until field tests by the soil engineer indicate that the moisture content and density of the fill are as previously specified. In the event that, in the opinion of the engineer, soils unsatisfactory as foundation material are encountered, they shall not be incorporated in the grading, and disposition will be made at the engineer's discretion.

APPENDIX II

WESTERN
SOIL AND FOUNDATION ENGINEERING, INC.

REFERENCES CITED

- Greensfelder, R.W., 1974, Maximum Credible Rock Accelerations from Earthquakes in California: California Division of Mines and Geology, Map Sheet 23.
- Kennedy, M. P., 1975, Geology of The San Diego Metropolitan Area, California: California Division of Mines and Geology, Bulletin 200.
- Seed, H.B. and Idriss, I.M., 1982, Ground Motions and Soil Liquefaction During Earthquakes, EERI Monograph Series.
- Slemmons, D.B., 1979, "Evaluation of Geomorphic Features of Active Faults for Engineering Design and Siting Studies", Association of Engineering Geologists Short Course.
- Tan, S. and Kennedy, M.P., 1996, Geologic Maps of the Northwestern Part of San Diego County, California: California Division of Mines and Geology, Open-File Report 96-02.
- Weber, Harold F. Jr., 1982, Recent Slope Failures, Ancient Landslides, and Related Geology of The North-Central Coastal Area, San Diego County, California: California Division of Mines and Geology, Report 82-12.

ATTACHMENTS

SITE PLAN

(Plate No. 1)

(In Back Pocket)

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

Soil Description	Group Symbol	Typical Names
I. COARSE GRAINED: More than half of material is <u>larger</u> than No. 200 sieve size.		
Gravels: More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".		
CLEAN GRAVELS	GW	Well graded gravels, gravel sand mixtures, little or no fines.
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines.
GRAVEL W/FINES	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
	GC	Clayey gravels, poorly graded gravel-sand, clay mixtures.
Sands: More than half of coarse fraction is smaller than No. 4 sieve size.		
CLEAN SANDS	SW	Well graded sand, gravelly sands, little or no fines.
	SP	Poorly graded sands, gravelly sands, little or no fines.
SANDS W/FINES	SM	Silty sands, poorly graded sand and silt mixtures.
	SC	Clayey sands, poorly graded sand and clay mixtures.
II. FINE GRAINED: More than half of material is <u>smaller</u> than No. 200 sieve size.		
Silts & Clays: Liquid limit <u>less</u> than 50		
	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
	OL	Organic silty and organic silty clays of low plasticity.
Silts & Clays: Liquid limit <u>greater</u> than 50		
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	CH	Inorganic clays of high plasticity, fat.
	OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils.

Plate No. 2

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	DESCRIPTION	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-1 ± 592 FORD 555C BACKHOE							
1		ML To SM		COLLUVIUM - Dark Reddish-Brown, Very Sandy Silt with Isolated Pebble to Cobble, Porous						1
2	C	ML To MH		Grades To	Dry To Damp	Soft				2
3		ML		Dark Brown, Clayey, Sandy Silt	Moist	Medium Stiff	101.6	4.6		3
4	C	ML To GM		ALLUVIUM - Dark Brown, Sandy Silt with Minor Decomposing Vegetation	Moist	Soft				4
5		GM								5
6				RESIDUUM - Mottled Orange and Gray, Very Sandy Silt, with Angular Gravel to Cobble of Meta-Volcanic Rock	Damp To Moist	Very Stiff	117.4	9.2		6
7										7
8										8
9										9
10				BOTTOM OF TRENCH @ 9 FEET						10
11										11
12										12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION		DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-2 ± 605 FORD 555C BACKHOE						
			DESCRIPTION						
1-		ML To SM	COLLUVIUM - Brown, Very Sandy Silt to Very Silty, Very Fine Grained Sand, Porous	Dry	Soft To Loose				-
2-		MH To ML	COLLUVIUM - Dark Brown, Clayey, Sandy Silt	Moist To Very Moist	Medium Stiff				-1
3-	C		Grades To			113.5	11.4		-2
4-	C	ML	Dark Reddish-Brown, Sandy Silt						-3
5-		SP	RESIDUUM - Gray, Very Sandy Silt, Well Cemented	Damp	Medium Dense To Dense	115.3	5.4		-4
6-			TONALITE - Dark Orangish-Brown, Fine to Medium Grained Decomposed Granitic Rock	Damp To Moist	Very Dense				-5
7-			BOTTOM OF TRENCH @ 6 FEET						-6
8-									-7
9-									-8
10-									-9
11-									-10
12-									-11
									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			DESCRIPTION						
1-		SM	T-3 ± 649 FORD 555C BACKHOE	Dry To Damp	Loose				1-
1-		To							1-
2-		ML							2-
3-	B	SP	TONALITE – Gray, Fine Grained Decomposed Granitic Rock, Moderately Jointed, Thinly Foliated	Damp	Very Dense				3-
4-			NEAR REFUSAL @ 5 FEET						4-
5-									5-
6-									6-
7-									7-
8-									8-
9-									9-
10-									10-
11-									11-
12-									12-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02			LOGGED BY VWG		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	DESCRIPTION	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-4 ± 727 FORD 555C BACKHOE							
-		SM To GM		COLLUVIUM – Brown, Gravelly to Cobbly, Very Silty, Very Fine Grained Sand	Dry	Loose				-
1-				↑ UNDULATING CONTACT						-1
2-										-2
3-		GM		SANTIAGO PEAK VOLCANICS – Greenish-Gray, Meta-Volcanic Rock, Moderately Fractured and Jointed	Dry	Very Dense				-3
4-										-4
5-	C						155.2	0.2		-5
6-				NEAR REFUSAL @ 5½ FEET						-6
7-										-7
8-										-8
9-										-9
10-										-10
11-										-11
12-										-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION		DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-5 ± 739 FORD 555C BACKHOE						
			DESCRIPTION						
1		SM To GM	COLLUVIUM – Brown, Very Silty, Very Fine Grained Sand, with Localized Angular Gravel to Cobble	Dry	Loose				1
2									2
3		GM	SANTIAGO PEAK VOLCANICS – Greenish-Gray, Meta-Volcanic Rock, Moderately Jointed	Dry	Very Dense				3
4									4
			NEAR REFUSAL @ 4 FEET						
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	<div>TRENCH NO. T-6</div> <div>ELEVATION ± 742 SOUTH →</div> <div>SAMPLING METHOD FORD 555C BACKHOE</div>	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
-		GM	COLLUVIUM – Brown, Silty, Gravelly, Very Fine Grained Sand	Dry	Loose				-
1			↑ UNDULATING CONTACT						-1
2		GM	SANTIAGO PEAK VOLCANICS – Bluish-Gray, Meta-Volcanic Rock	Dry To Damp	Very Dense				-2
3									-3
4			Excavates as Silty, Sandy Angular Cobble						-4
5			Moderately Jointed and Fractured						-5
6									-6
7									-7
8			NEAR REFUSAL @ 8 FEET						-8
9									-9
10									-10
11									-11
12									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			DESCRIPTION						
-		GM	COLLUVIUM - Brown, Very Silty, Gravelly Sand	Dry	Loose				-
1-			SANTIAGO PEAK VOLCANICS - Bluish-Gray, Meta-Volcanic Rock, Moderately Jointed and Fractured	Dry To Damp	Very Dense				-1
-	-								
2-	-								
-	-								
3-	-								
-	-								
4-	-								
-	-								
5-	-								
6-									-6
7-	B								-7
8-									-8
9-									-9
10-			NEAR REFUSAL @ 9 FEET						-10
11-									-11
12-									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02			LOGGED BY VWG		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-8 ± 642 FORD 555C BACKHOE						
			DESCRIPTION						
1		ML	ALLUVIUM – Dark Brown, Very Sandy Silt with Randomly Oriented Angular Pebble to Cobble of Metamorphic Rock, Very Fractured Soil Structure in Upper 1½ Feet	Damp To Moist	Medium Stiff To Very Stiff	104.1	11.4		1
2		GM							2
3	C								3
4									4
5		GM	RESIDUUM – Dark Orangish-Brown, Sandy Siltstone, with Angular Pebble of Metamorphic Rock, Well Cemented	Damp To Moist	Hard To Very Hard	109.1	8.9		5
6	C								6
7			BOTTOM OF TRENCH @ 7 FEET						7
8									8
9									9
10									10
11									11
12									12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02			LOGGED BY VWG		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			DESCRIPTION						
1-		SM	COLLUVIUM - Orangish-Brown, Very Silty, Fine Grained Sand, Very Porous	Dry	Loose				1-
2-		SP	TONALITE - Gray, Fine to Medium Grained, Slightly Decomposed Granitic Rock	Dry	Very Dense				2-
3-			REFUSAL @ 3 FEET						3-
4-									4-
5-									5-
6-									6-
7-									7-
8-									8-
9-									9-
10-									10-
11-									11-
12-									12-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02			LOGGED BY VWG		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			DESCRIPTION						
1-		SM	COLLUVIUM - Brown, Silty, Fine Grained Sand, Porous	Dry	Loose				1-
2-									2-
3-									3-
4-	B	SM To SP	RESIDUUM - Orangish-Brown, Slightly Silty, Fine to Medium Grained Sand Grades To TONALITE - Gray, Fine to Medium Grained, Slightly Decomposed Granitic Rock	Damp	Dense To Very Dense				4-
5-			NEAR REFUSAL @ 5 FEET						5-
6-									6-
7-									7-
8-									8-
9-									9-
10-									10-
11-									11-
12-									12-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-11 ± 635 FORD 555C BACKHOE						
			DESCRIPTION						
-		SM	COLLUVIUM - Brown, Silty, Fine Grained Sand	Dry	Loose				-
1-	C	ML	ALLUVIUM - Dark Brown, Very Sandy Silt with Randomly Oriented Angular Pebble to Cobble of Metamorphic Rock	Moist To Very Moist	Medium Stiff	111.7	15.0		-1
2-		To							-
3-	C	GM							-2
4-									-3
5-			RESIDUUM - Orangish-Brown, Slightly Silty, Fine to Medium Grained Sand	Damp	Dense				-4
6-		SM							-
7-		To							-6
8-		SP							-
			Grades To						-7
			TONALITE - Gray, Fine to Medium Grained, Slightly Decomposed Granitic Rock	Damp To Moist	Very Dense				-
			BOTTOM OF TRENCH @ 8 FEET						-8
9-									-9
10-									-10
11-									-11
12-									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02		LOGGED BY VWG			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-12 ± 612 FORD 555C BACKHOE						
			DESCRIPTION						
-		SM	COLLUVIUM - Brown, Silty, Fine to Medium Grained Sand	Damp	Loose				-
1-									-1
-	C	SM To ML	RESIDUUM - Reddish-Brown, Very Silty, Fine to Medium Grained Sand	Moist		122.6	8.3		-
2-			Grades To		Dense To Very Dense				-2
-									-
3-									-3
-		SP	TONALITE - Orangish-Gray, Fine to Medium Grained, Slightly Decomposed Granitic Rock	Damp					-
4-									-4
-									-
5-			BOTTOM OF TRENCH @ 4½ FEET						-5
-									-
6-									-6
-									-
7-									-7
-									-
8-									-8
-									-
9-									-9
-									-
10-									-10
-									-
11-									-11
-									-
12-									-12
-									-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-10-02		LOGGED BY NSB			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. T-13 ELEVATION ± 617 SAMPLING METHOD FORD 555C BACKHOE <hr/> DESCRIPTION	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
-		SM To GM	COLLUVIUM – Brown, Silty, Fine to Medium Grained Sand	Dry	Very Dense				-
1-		GM	RESIDUUM – Orangish-Gray, Gravelly, Silty, Fine Grained Sand	Damp	Dense				-1
2-			Grades To	To	To				-2
3-	C	GM To SP	SANTIAGO PEAK VOLCANICS – Dark Bluish-Gray, Very Fine Grained Meta-Volcanic Rock	Moist	Very Hard	114.8	7.6		-3
-			NEAR REFUSAL @ 3 FEET						-3
4-									-4
5-									-5
6-									-6
7-									-7
8-									-8
9-									-9
10-									-10
11-									-11
12-									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02		LOGGED BY NSB			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-14 ± 633 FORD 555C BACKHOE						
			DESCRIPTION						
1-		SM	COLLUVIUM - Reddish-Brown, Very Silty, Fine to Medium Grained Sand, Porous	Dry To Damp	Loose To Medium Dense				-1
2-		SM To GM	RESIDUUM - Reddish-Brown, Very Silty, Fine to Medium Grained Sand with Fractured Metamorphic Rock	Dry	Very Dense				-2
3-			Grades To						-3
4-	C	SP	SANTIAGO PEAK VOLCANICS - Dark Bluish-Gray, Very Fine Grained Meta-Volcanic Rock	Dry	Very Dense				-4
5-			REFUSAL @ 4½ FEET						-5
6-									-6
7-									-7
8-									-8
9-									-9
10-									-10
11-									-11
12-									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02			LOGGED BY NSB		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-15 ± 700 FORD 555C BACKHOE						
			DESCRIPTION						
-		GM	FILL - Reddish-Brown, Gravelly, Silty, Fine to Medium Grained Sand	Damp	Loose				-
1-		GM	COLLUVIUM - Reddish-Brown, Silty, Fine to Medium Grained Sand with Rock Fragments	Damp	Loose To Medium Dense				-1
2-		SP	SANTIAGO PEAK VOLCANICS - Greenish-Gray, Very Fine Grained Meta-Volcanic Rock, Slightly Fractured	Dry	Dense To Very Dense				-2
3-	C		REFUSAL @ 3 FEET						-3
-									-
4-									-4
-									-
5-									-5
-									-
6-									-6
-									-
7-									-7
-									-
8-									-8
-									-
9-									-9
-									-
10-									-10
-									-
11-									-11
-									-
12-									-12
-									-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02		LOGGED BY NSB			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-16 ± 667 FORD 555C BACKHOE						
			DESCRIPTION						
-		GM	COLLUVIUM - Reddish-Brown, Silty, Fine to Medium Grained Sand with Abundant Angular Pebble	Dry	Loose To Medium Dense				-
1-			RESIDUUM - Reddish-Gray, Silty, Fine to Medium Grained Sand with Fractured Rock	Dry					-1
-									-
2-		GM			Dense To Very Dense				-2
-									-
3-			Grades To						-3
-									-
4-	C	GM To SP	SANTIAGO PEAK VOLCANICS - Dark Blue, Meta-Volcanic Rock	Dry To Damp		167.7	2.8		-4
-									-
5-									-5
-			BOTTOM OF TRENCH 5 FEET						-
6-									-6
-									-
7-									-7
-									-
8-									-8
-									-
9-									-9
-									-
10-									-10
-									-
11-									-11
-									-
12-									-12
-									-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02		LOGGED BY NSB			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-17 ± 720 FORD 555C BACKHOE						
			DESCRIPTION						
-		SM	COLLUVIUM - Reddish-Brown, Silty, Fine to Medium Grained Sand, Porous	Dry To Damp	Loose To Medium Dense				-
1-									-1
-									-
2-									-2
-									-
3-									-3
-		SM To GM	RESIDUUM - Reddish-Gray, Very Silty, Fine Grained Sand with Fractured Rock	Dry	Dense				-
4-	C		Grades To						-
-		SP	SANTIAGO PEAK VOLCANICS - Bluish-Gray, Very Fine Grained Metamorphic Rock	Dry	Very Dense	108.9	1.7		-4
5-									-
-			BOTTOM OF TRENCH @ 5 FEET						-5
6-									-
-									-6
7-									-
-									-7
8-									-
-									-8
9-									-
-									-9
10-									-
-									-10
11-									-
-									-11
12-									-
-									-12
-									-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02			LOGGED BY NSB		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			DESCRIPTION						
-		GM	COLLUVIUM - Brown, Silty, Gravelly, Fine to Medium Grained Sand	Dry	Loose				-
1-									-1
-									-
2-			SANTIAGO PEAK VOLCANICS - Bluish-Gray, Slightly Fractured Meta-Volcanic Rock	Dry	Dense				-2
-				To	To				-
3-	C	GM		Damp	Very Dense				-3
-									-
4-									-4
-									-
5-			NEAR REFUSAL @ 5 FEET						-5
-									-
6-									-6
-									-
7-									-7
-									-
8-									-8
-									-
9-									-9
-									-
10-									-10
-									-
11-									-11
-									-
12-									-12
-									-
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02			LOGGED BY NSB		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-19 ± 685 FORD 555C BACKHOE						
			DESCRIPTION						
1		GM	COLLUVIUM - Reddish-Brown, Silty, Fine to Medium Grained Sand and Fractured Rock	Dry	Loose To Medium Dense				1
2		GM	RESIDUUM - Reddish-Gray, Silty, Fine to Medium Grained Sand and Fractured Rock	Dry	Dense To Very Dense				2
3		To 5	Grades To						3
4		SP							4
5	C		SANTIAGO PEAK VOLCANICS - Bluish-Gray, Meta-Volcanic Rock, Moderately Fractured	Dry	Dense To Very Dense	158.2	0.8		5
6									6
7	B								7
8			Grades To						8
9									9
10									10
11									11
12									12
13	C	SP	Gray, Meta-Volcanic Rock	Damp To Moist	Dense	121.2	5.8		13
14			BOTTOM OF TRENCH @ 14 FEET						14
15									15
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02			LOGGED BY NSB		

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-20 ± 705 FORD 555C BACKHOE						
			DESCRIPTION						
-		GM	COLLUVIUM - Reddish-Brown, Silty, Fine to Medium Grained Sand and Fractured Rock	Dry	Loose To Medium Dense				-
1-									-1
2-	C	GM	RESIDUUM - Cemented Breccia Consisting of Angular Metamorphic Pebbles and Cobbles Supported in a Matrix of Orangish-Gray, Silty, Fine Grained Sand	Damp	Very Dense	125.7	3.1		-2
3-			NEAR REFUSAL @ 3 FEET						-3
4-									-4
5-									-5
6-									-6
7-									-7
8-									-8
9-									-9
10-									-10
11-									-11
12-									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02		LOGGED BY NSB			

SURFACE EXPLORATORY LOGS

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	TRENCH NO. ELEVATION SAMPLING METHOD	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %	DEPTH (FEET)
			T-21 ± 735 FORD 555C BACKHOE						
			DESCRIPTION						
-		GM	RESIDUUM - Cemented Breccia, Brown, Silty, Rocky Sand	Dry	Dense				-
1-									-1
2-		SP							-2
3-	C		SANTIAGO PEAK VOLCANICS - Bluish-Gray, Very Fine Grained Meta-Volcanic Rock	Dry	Very Dense	176.4	0.6		-3
4-									-4
5-									-5
6-									-6
7-									-7
			REFUSAL @ 7 FEET						
8-									-8
9-									-9
10-									-10
11-									-11
12-									-12
JOB NUMBER 02-11			BUENA CREEK SUBDIVISION	DATE LOGGED 07-11-02		LOGGED BY NSB			

SURFACE EXPLORATORY LOGS

LABORATORY TEST RESULTS

Maximum Density/Optimum Moisture

Sample Location	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (percent)
T-3 @ 3'	Brownish-Gray, Silty, Fine to Medium Grained Sand	130.8	8.8
T-10 @ 4'	Pale Brown, Slightly Silty, Fine to Medium Grained Sand	130.5	8.5
T-19 @ 7½'	Pale Orangish-Gray, Slightly Gravelly, Silty, Fine Grained Sand	119.2	12.0

Direct Shear

Sample Location	Apparent Cohesion (psf)	Angle of Internal Friction (degrees)
*T-3 @ 3'	75	34

*Sample remolded to 90 percent of maximum dry density and 3 percent over optimum moisture content.

Expansion Index

Sample Location	Initial Moisture Content (%)	Final Moisture Content (%)	Expansion Index	Expansion Potential
T-10 @ 4'	7.5	13.7	0	Very Low
T-11 @ 3'	10.5	21.2	36	Low

Plate No. 24

LABORATORY TEST RESULTS – Cont.

Mechanical Sieve Analysis

Sample Location	1"	Percent Passing U.S. Standard Sieve				
		#4	#10	#40	#100	#200
T-11 @ 1½'	100.0	99.9	99.7	91.9	80.8	73.3
T-12 @ 1½'	100.0	100.0	98.8	70.9	56.6	48.0
T-16 @ 4'	19.9	9.7	7.8	5.0	4.0	3.5

Resistance Value

<u>Sample</u>	<u>R-Value</u>
T-7 @ 7'	71
T-10 @ 4'	79

In-Situ Moisture and Density

Sample Location	Dry Density (pcf)	Moisture Content (%)	Sample Location	Dry Density (pcf)	Moisture Content (%)
T-1 @ 2'	101.6	4.6	T-12 @ 1½'	122.6	8.3
T-1 @ 4'	117.4	9.2	T-13 @ 2½'	114.8	7.6
T-2 @ 2½'	113.5	11.4	T-16 @ 4'	167.7	2.8
T-2 @ 3½'	115.3	5.4	T-17 @ 4'	108.9	1.7
T-4 @ 4½'	155.2	0.2	T-19 @ 4½'	158.2	0.8
T-8 @ 3'	104.1	11.4	T-19 @ 13'	121.2	5.8
T-8 @ 6'	109.1	8.9	T-20 @ 2'	125.7	3.1
T-11 @ 1½'	111.7	15.0	T-21 @ 3'	176.4	0.6

Plate No. 25

TABLE I

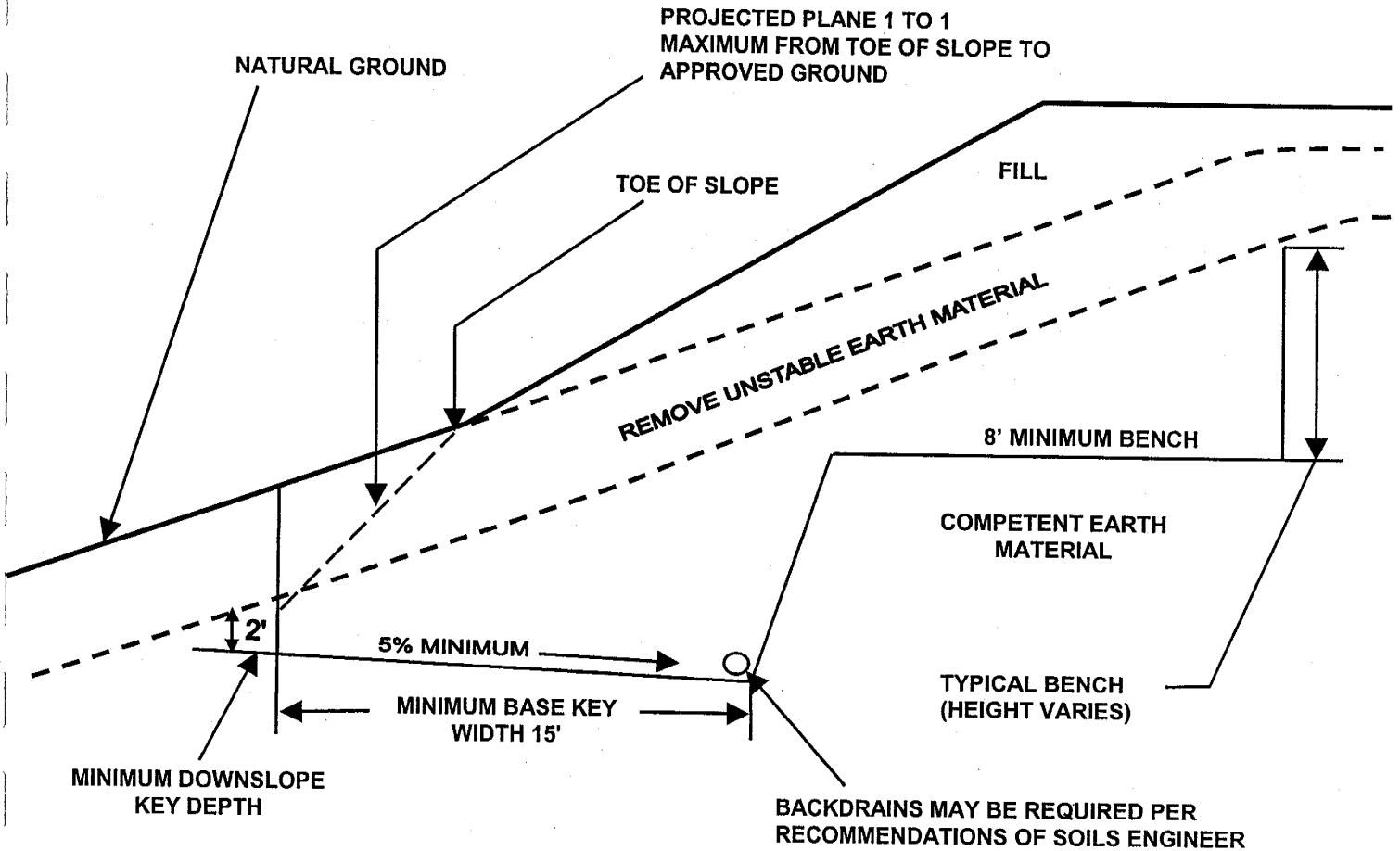
Trench Number	Depth of Soil Removal Below Existing Grade (ft.)	Trench Number	Depth of Soil Removal Below Existing Grade (ft.)
T-1	5½	T-12	1½
T-2	3½	T-13	1½
T-3	3	T-14	1½
T-4	1½	T-15	2
T-5	2	T-16	1½
T-6	1½	T-17	3½
T-7	1	T-18	1½
T-8	5	T-19	2
T-9	1½	T-20	2
T-10	3	T-21	1
T-11	5		

NOTE: It should be recognized that variations in soil conditions might occur between exploratory excavations that will require additional removal. In areas where fill slope toe keys are proposed, add a minimum of 2 feet to removal depths presented above.

Exploratory trenches encountered in the removal process should be recompact an additional 2 feet below the depths shown in the above table.

Plate No. 26

FILL SLOPE KEY



BUENA CREEK SUBDIVISION	
JOB NO.: 02-11	DATE: 08-21-02

Plate No. 27

WESTERN
SOIL AND FOUNDATION ENGINEERING, INC.